BIOSECURITY: Health Protection and Sanitation Strategies for Cattle

and General Guidelines for Other Livestock

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Factsheet

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INTRODUCTION

Livestock owners and industry personnel who support their farms are genuinely concerned with the health, wellbeing and productivity of Ontario's cattle. They recognize that disease outbreaks are preventable. They adopt health management practices to prevent the introduction and/or spread of diseases in Ontario's herds.

There are very sound economic reasons for disease prevention. Some herd owners spend thousands of dollars each year fighting disease outbreaks. There are many more costs associated with chronic diseases that may go unnoticed. In addition to the costs of health care, valuable livestock and production are also lost. Animal welfare, pride in stockmanship and peace of mind are also major incentives to minimize disease occurrence.

Some diseases can be spread through the air. These are difficult to prevent. However, good biosecurity, nutrition, early disease detection and overall health management will help minimize the impact of air-borne diseases.

This Factsheet describes management strategies to prevent the introduction of disease to a farm or control the spread of disease amongst animals within a farm. Although the Factsheet refers specifically to cattle, the general strategies are applicable to other farm livestock. The management strategies that prevent the entry and spread of disease can also be called the "biosecurity plan" for the farm. Every farm should have a biosecurity plan as part of its overall health management strategy.

A section on the control of foreign animal diseases appears at the end of this Factsheet.

PREVENT THE INTRODUCTION OF DISEASE: Management of New Arrivals

Contagious diseases are transmitted directly from an infected animal to an uninfected animal. This is the most common method of disease transmission amongst animals. There are four main strategies for managing the potential introduction of disease when adding animals to the farm.

Maintain a closed herd

The first method is not to purchase cattle. For practical reasons there are few truly closed herds in Ontario. Owners would have to strictly adhere to the following requirements:

- use home-grown replacements for maintaining and increasing herd size
- prevent fence-line contacts of their stock with other cattle
- use artificial insemination for breeding and not bring in bulls
- not exhibit at shows
- restrict visitors

Isolate new arrivals

Quarantine of incoming animals is ideal. In most herds, minimizing contact with the rest of the herd may be the only practical method of isolation. To isolate new arrivals:

- use separate housing, feeding and birthing areas (ideal)
- use separate housing and feeding areas (acceptable)

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- prevent contact with other animals (minimum acceptable)
- prevent manure movement from the isolation area to the rest of the herd
- isolate for 21–30 days
- observe and examine for early disease detection
- milk isolated cows last
- test for diseases prior to addition to the main herd

Know the source of purchases and use laboratory testing

Many owners take precautions when purchasing animals. They also use laboratory-testing programs to maintain minimal disease herds or disease-free herd status. To know the health status of herd additions:

- purchase pregnant or virgin heifers to minimize the risk of introducing mastitis
- determine the vaccination and health status of individuals and the herd of origin
- purchase from herds of known health status such as those certified under the Canada Health Accredited Herds program

The 21–30 day isolation period is ideal for:

- bacterial culture of milk and
- blood testing for specific diseases

Additional information on the Canada Health Accredited Herds program is available from the District Veterinarian, Canadian Food Inspection Agency at www.inspection.gc.ca/english/directory/offbure.shtml

Use vaccines

Vaccines are commonly used to protect cattle against respiratory disease and abortion. For herd additions, these vaccines may be given during the 21 to 30-day isolation period. Bovine virus diarrhea (BVD) and infectious bovine rhinotracheitis (IBR) have been diagnosed in Ontario herds. Vaccination against these two diseases should be the cornerstone of every herd vaccination program. Consult your veterinarian for specific recommendations on these and other aspects of health management for livestock.

PREVENT THE SPREAD OF DISEASES: Management of Farm Traffic

Bacteria, viruses or other agents of disease are infectious when they are capable of causing infection in exposed animals. Farm visitors wearing boots or clothing freshly contaminated with infectious agents can spread diseases within a farm and among farms. Birds, rodents, pets, people, equipment and vehicles contaminated with manure (or other bodily excretions) are potential disease carriers.

Control birds

Pigeons, sparrows, starlings and swallows are the most common birds found in and outside barns. They may carry infectious agents on their feet and within their digestive system. To control bird populations:

- plug small and large nesting holes and perches in your barn that are suitable for sparrows and starlings
- screen all openings in natural ventilation dairy barns
- seal off openings into silo roofs
- screen ledges used as nesting sites by pigeons

Control rats and mice

A rat deposits 25,000 droppings and a mouse deposits 17,000 droppings in one year. Even a small population of these rodents may severely contaminate feed supplies. In addition, rodents carry disease agents on their feet and fur, and they destroy millions of dollars worth of feed, supplies and buildings each year. To control rats and mice:

- construct rodent-proof buildings
- eliminate safe hiding places and nesting sites
- remove food and water supplies
- destroy existing populations by poisoning, fumigating, or trapping

OMAFRA's website has information on controlling rodents in livestock facilities. Please consult with a professional about the use of poisons and other methods of rodent destruction.

Control people and pets

People spread contaminated material directly on footwear, hands and clothing. To decrease the spread of contaminants:

- inform herd workers, visitors and truckers of your farm protection methods and insist upon co-operation
- discourage visitors from entering the housing and feeding areas

- post "Do Not Enter" signs with a telephone number for contacting you on livestock buildings and farm entrance gates
- discourage visitors from touching cattle and calves
- designate a specific visitor area to minimize contacts
- insist visitors wash their boots before entering and leaving
- supply rubber boots or plastic disposable boots and clean coveralls for visitors
- provide a footbath containing disinfectant
- insist workers wash their hands before milking cows and after working with sick animals
- insist workers wear protective plastic or rubber gloves for calving cows
- control the movement of dogs and cats between farms
- minimize the contact of dogs and cats with animals and feeding areas
- vaccinate farm dogs and cats for rabies and diseases common in your area
- wash farm clothing with detergents and bleach or washing soda

Control vehicles and traffic patterns on the farm

Vehicles spread contaminated material on their tires, fenders and undercarriages. To decrease the spread of contaminants by vehicles:

- provide a separate laneway for use by the milk truck in accordance with the regulations of the Milk Act. This laneway must not be contaminated with manure
- provide "clean" routes for feed delivery vehicles – routes that are not contaminated by manure
- provide cattle with laneways that do not cross lanes used by milk trucks and feed delivery vehicles
- avoid sharing manure handling equipment with neighbours
- wash equipment to be shared with neighbours and insist on clean equipment coming onto your farm

The most common means of contaminating feed or feeding areas is by on-farm equipment used for handling manure. To decrease this risk:

- avoid using manure handling equipment for handling feeds, and if necessary wash before using for handling feed
- lay out feed storage and manure handling sites to avoid common traffic routes
- design and build barns where cows do not cross feeding alleys

Control feed and feeding equipment

Consider contaminated feeds (forages, pasture, grains and concentrates, water and waste milk), feeding equipment and systems when developing an on-farm biosecurity plan. The section on managing vehicles and farm traffic provides some basic information. The biosecurity of feeding should include plans to:

- purchase from suppliers with quality assurance and monitoring programs
- protect feeds from contamination through proper storage of chemicals, pesticides and medications
- protect feed from manure contamination
- establish storage facilities for feeds for various classes of livestock and systems to avoid errors in feeding practices
- harvest feeds at proper moisture contents and ensile them in suitable storage systems
- monitor water quality and assure clean delivery systems

Clean equipment

Disease can spread from animal to animal and farm to farm indirectly by small and large equipment. To reduce this method of spread:

- keep visiting vehicles out of areas accessible to livestock
- thoroughly wash and disinfect the inside, outside and tires of equipment shared with neighbours
- use a new disposable needle for each animal when administering treatments
- disinfect dehorners, hoof knives and trimmers after using on each animal
- use your own halters and clippers rather than borrowing them
- use separate shovels and forks for feeding and manure handling
- sanitize nursing bottles and buckets after each calf feeding
- maintain clean water troughs, water bowls, and feed mangers
- clean and sanitize equipment and materials used for handling deadstock

Management of Groups and Housing

Young animals acquire infectious diseases through exposure with older infected or carrier animals (see Table 1). Housing and management systems,

especially for dairy cattle, are constructed to minimize contact between young and older animals. In effect, the young are given time to develop immunity to diseases before joining the adults. The facilities also permit implementation of feeding and management practices to assure maximum growth, health and comfort. Dairy cattle owners implementing these strategies should:

- implement maternity-pen and newborn-calf management practices that prevent calves from ingesting manure. See information guidelines for the Johne's Education and Management Assistance Program for Ontario herds on the OMAFRA website
- separate pre-weaned dairy calves from all other age groups
- house each milk-fed dairy calf in an individual pen or hutch
- place hutches away from dairy barn exhaust fans
- alternatively, house milk-fed calves in groups of less than eight calves
- house 4–8-month-old dairy calves in groups separately from older heifers
- house yearling and breeding age dairy heifers separately
- separate dry dairy cows from milking cows
- implement practices to prevent the spread of contagious mastitis (e.g. segregate cows with mastitis to the end of the milking order, sanitize milking equipment after milking a mastitic cow)
- separate replacement beef heifers from the cows
- move beef cows to a clean pasture, away from the wintering area, for calving
- organize chore routine to feed and milk isolated cattle after the main herd
- provide adequate pen, stall or bedded area per animal
- provide adequate feed bunk length and water trough access per animal

Sanitation and Disinfection Management

Spread of disease is reduced when premises are clean and sanitary. In some cases, provincial legislation assures that minimum standards will be maintained. For example, the *Milk Act* (1987) regulates sanitation on dairy farms in Ontario. Several common management procedures assure adequate sanitation of farm premises.

Table 1. Examples of diseases spread from older to younger cattle

Disease	Transmission
E. coli scours	contact with feces
Salmonellosis	contact with feces
Leptospirosis	contact with urine, uterine discharge, aborted foetus
Johne's	contact with feces
Enzootic Bovine Leucosis	contact with blood from needles, dehorners, tattoo pliers
Bovine Virus Diarrhea	contact with body fluids from sick and carrier animals
Gastrointestinal parasites	contact with eggs in feces
Coccidiosis	contact with oocysts in feces

Disposal of dead animals

Carcasses can be a hazard to people and other animals. They can contaminate soil, air and water and require special handling. To minimize property contamination and risk of spreading disease, owners should:

- dispose of dead animals within 48 hours of their death
- include all contaminated bedding, milk, manure or feed
- prevent scavenging by dogs, cats, birds, foxes, coyotes, wolves or bears
- wear protective clothing
- clean and disinfect the area that was occupied by the dead cattle.

Producers may choose on-farm disposal methods or have the dead animal picked up by a licensed collector.

On-farm disposal options under the Disposal of Dead Farm Animals Regulation [O. Reg 106/09] include:

- burial
- composting
- incineration
- disposal vessels
- anaerobic digestion (in some cases)

For burial, incineration or composting the Regulation describes minimum separation distances from a number of features which include:

- livestock housing facilities
- field drainage tiles

- residential and commercial lands
- surface water
- bedrock and aquifers
- wells (including municipal wells and floodplains)

The regulation also includes specific guidelines for each disposal option and limitations on the volume of deadstock disposed of for each option.

Producers also may transport their own deadstock to:

- common bins
- waste disposal sites approved under the *Environmental Protection Act*
- disposal facilities licensed under the *Food Safety and Quality Act*, 2001 (FSQA) [Regulation 105/09]
- a licensed veterinarian for post mortem

Deadstock may be picked up by a collector licensed under the FSQA. Federal regulations apply to the transportation of dead cattle. Cattle carcasses or Specified Risk Materials (SRM) removed from a carcass must be dyed with a visible stripe. SRM are tissues that have been shown in infected cattle to contain concentrated levels of the bovine spongiform encephalopathy (BSE) agent. Collectors are responsible for applying the dye prior to removal of carcasses.

Producers transporting their deadstock or SRM to a receiver must follow guidelines in the FSQA regulations. To move dead cattle or SRM off-farm, producers must obtain a free 90-day permit from the Canadian Food Inspection Agency (CFIA). The process may involve an on-farm inspection by CFIA staff.

Cattle that die during transportation are considered to be SRM. The transporter requires a permit to bring the carcass back to the premises of origin or to a facility that is permitted by the CFIA to store, process or dispose of SRM.

CFIA has a comprehensive set of documents that outline the policy related to components that may not be added to feed (the enhanced feed ban). The documents are available at www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/enhren/decdoce.shtml#waste

Manage manure and control flies

Infected animals often shed infectious agents in their feces, urine and other bodily fluids. The agents may contaminate feed, water and housing. To reduce the risk of spreading disease by manure:

- plan and install manure systems to prevent environmental contamination and comply with the Minimum Distance Separation II formula (see www.omafra.gov.on.ca/english/landuse/facts/mds_order.htm)
- compost or store manure under conditions that destroy most disease-producing bacteria
- remove manure frequently from barns, yards and holding areas to prevent completion of life cycles by parasites and flies
- control the fly population by removing manure, using traps, baits or flypaper, using insecticides, using biological predators (wasps) or combinations of control measures
- store manure so it is inaccessible to cattle, especially young stock
- protect young stock from exposure to manure piles
- assure clean teats and udders for nursing calves by using clean calving areas and bedding packs with clean straw or shavings

See the factsheet *Control of Insect and Related Pests of Livestock and Poultry in British Columbia* available online at www.agf.gov.bc.ca/cropprot/livestck.htm for more specific information. This guide contains specific chemical control recommendations for arthropods affecting livestock. The site also has factsheets describing the biology and management of specific pests.

Manage maternity, sick and calf pens

Exposure of freshening cattle and calves to infectious agents is reduced by carefully managing maternity and sick pens. For disease control:

- use maternity pens only for freshening cattle
- use sick pens only for sick cattle
- prevent animal-to-animal contact between sick pens and maternity pens
- clean all manure from the pens after use
- disinfect the walls and floors after use
- allow the pens to dry after disinfection
- bed the pens well before the next animal enters
- if applicable, move cows and heifers to clean, dry pastures or paddocks for calving

Use disinfectants

Information about disinfectants is available on the product label or from farm supply dealers, veterinarians, the Canadian Animal Health Institute and the product manufacturers.

The Canadian Compendium of Veterinary Products, 2009, 11th Edition, contains the monographs of many common disinfectants. The indications for use, special properties, advantages, cautions and directions are described for each product. Your veterinarian should have a copy of this book in his/her veterinary clinic.

Familiarize yourself with the product information contained on the product label or package insert before making a selection. For a particular application, determine if a product:

- has activity against bacteria, fungi or viruses
- is active in organic debris (manure)
- is effective in hard water
- has decreased or enhanced activity in heat
- has residual activity for a period of time after application
- is compatible with soaps
- is caustic or has irritating fumes
- can be used on feeding equipment
- can be disposed of in accordance with provincial regulations and
- is appropriate for the intended use

Several disinfectants for stables, housing and footbaths for visitors are shown in Table 2. These were obtained from the Compendium of Veterinary Products and are listed as examples, not endorsement. Other products may be available. Use the product information brochure included with the product to determine if the disinfectant meets the criteria for your application.

Disinfectants fall into six major categories: chlorhexidine, formaldehyde/glutaraldehyde, iodine complex, isopropanol, phenolic, or quarternary ammonium disinfectants. Several disinfectants fall into the other category not included in those mentioned above.

ALWAYS READ AND FOLLOW LABEL INSTRUCTIONS

Table 2. Several common disinfectants for farm use

Active Ingredient	Name	Manufacturer
Chlorhexidine acetate	Hibitane® Disinfectant	Wyeth
Chlorine/sulfates	AVS Virucidal Extra	Bio Agri Mix
	B - 90	Agro B
	Virkon® Disinfectant Cleaner	Vétoquinol
Cleaners/general	Biosolve	Vétoquinol
Enzymes	Asepto-zyme™	Ecolab Healthcare
Formaldehyde/ glutaraldehyde	Formaline	Vétoquinol
	Profilm®	Pfizer
Iodine complex	Dairy Dine	Dominion
	Iosan™	WestAgro
	Premise Disinfectant	WestAgro
Phenol	Beaucoup	Ecolab Healthcare
	Multi Phenolic Disinfectant	Bio Agri Mix
Quarternary ammonium	BioSentry™904™	Pfizer
	Coverage 256®	Steris
	Proquat®	Pfizer
	Quatxyl® -D Plus	Pfizer
	Rocco	Vétoquinol
	Lysol	Reckitt Benckiser (Canada) Inc.
Various ingredients	BioSentry™ Acid-A-Foam	Pfizer
	BioSentry™ EZ Kleen™	Pfizer
	BioSentry™ Fog Enhancer™	Pfizer
	Fumalyse II	Bio Agri Mix
	Hyperox	Vétoquinol

Foreign Animal Disease

For more than 50 years, Canada has successfully used border and import restrictions to prevent the entry of foreign animal disease (FAD). Ontario's livestock producers support these actions and supplement them with some common sense on-farm strategies.

Border Control

Canada prevents the introduction of FAD by strict border controls. The Canadian Food Inspection Agency and Customs Canada continue to:

- assess the risk of specific products that other countries want to import
- assess the animal health system in other countries
- ban the importation of ruminant (and some other) animals and their products
- ban the importation of used farm equipment
- use "sniffer" beagles to find food products carried by passengers

- seize and destroy foodstuffs and other illegal imports
- question passengers and inspect their baggage
- use disinfectants for passengers' shoes
- conduct specific tests and inspections of animals entering Canada

On-Farm Control

Ontario's livestock producers prevent the introduction of FAD by common sense and practical farm-gate strategies.

For example, food and mouth disease (FMD) virus is easily killed by common procedures for cleaning or washing clothes — dry cleaning, bleach or washing soda. Experiments carried out 30 years ago showed that people examining the head area of clinically affected pigs harboured the FMD virus in their nasal cavity for less than two days. In these trials, infection of FMD was transmitted by snorting and coughing into the noses of steers within 30 minutes after examining the affected pigs. Presumably, the concept of a "stand-down period" after exposure to FMD virus came from these experiments. This confirms that persons who have been working with FMD animals must stay away from healthy animals for more than two days. Please see the Canadian Food Inspection Agency website for more information on foot and mouth disease.

To prevent the introduction of foreign animal diseases from infected animals on farms in countries with diseases, Ontario's producers should:

- ask foreign visitors about diseases in their country of origin
- ask foreign visitors about their attendance on farms in their country of origin
- ask about and check the cleanliness of shoes and clothes of visitors
- provide rubber boots and protective clothing
- provide plastic boots
- restrict visitors from their farm if the visitor has been on a farm with a contagious foreign animal disease within the previous five days

In case of an outbreak of a foreign animal disease in Ontario, federal veterinarians may impose bans on cattle movements to prevent the spread of contagious diseases from animal to animal. There would also be other control actions to stop the disease from spreading.

Disinfectants for Boot Wash

- **Phenolic disinfectants** (Beaucoup and Multi Phenolic Disinfectant) are examples of this class of disinfectant. Follow the label directions for mixing with water.

- **Iodophors.** Iosan is an example. Generally, prepare the boot wash by mixing 2–4 oz/gal of water (60–120 mL/4.5 L).

- **Hypochlorites.** Clorox or other brands of bleach that contain 5.25% sodium hypochloride. Mix 2–4 oz/gal (60–120 cc/4.5 L) of water.

- **Chlorhexidine.** Hibitane Disinfectant (2% w/v). Mix 120 mL per 3.8 L water.

- **Sulfates.** Virkon is an example. The common dilution rate for Virkon is 1% weight/volume. Mix a 50-gm packet in 5 L water.

Organic material (dirt and manure) inactivates many disinfectants. Therefore, clean your boots with a brush and water, removing all dirt and manure so that the disinfectant will sanitize the boots. Hypochlorites and iodophors will cause deterioration of rubber boots if left in contact. Prolong boot life by rinsing them with clear water after thoroughly disinfecting.

CONCLUSION

The work of disease prevention is never finished. Owners have the ultimate responsibility for herd protection. Visitors must respect biosecurity protocols put in place by livestock owners. Savvy livestock owners implement biosecurity strategies to prevent the introduction of disease to their herds and also to prevent the spread of diseases already present. To protect their herds, owners commonly:

- manage new arrivals
- manage and control farm traffic
- manage groups of animals and their housing
- sanitize and disinfect
- impose "stand-down periods" for visitors from foreign countries

Review strategies for health protection and sanitation management of your herd using the lists above. Consult a veterinarian regarding which biosecurity strategies to use in your herd health program. Implement the appropriate strategies to insure health and comfort for your cattle. Make sure all workers and visitors are aware of their role in safeguarding the health of the herd.

For foreign animal diseases, border controls are a major part of the national biosecurity line of defence. On-farm biosecurity is an equally important line of defence. Together these steps minimize the entry and impact of diseases on your farm and in Canada.

SOURCES OF ADDITIONAL INFORMATION

Rodent Control in Livestock Facilities, OMAFRA Factsheet Order No. 07-009. www.omafra.gov.on.ca/english/livestock/dairy/facts/07-009.htm

Canadian Compendium of Veterinary Products, 11th Edition 2009. CCVPBS, 148 King St., P.O. Box 39, Hensall, ON, N0M 1X0. http://canstore.naccvp.com

Canadian Animal Health Institute, 160 Research Lane, Suite 102, Guelph, ON, N1G 5B2. www.cahi-icsa.ca

Canadian Food Inspection Agency www.inspection.gc.ca

Animal Disease Information: Animal Biosecurity. www.inspection.gc.ca/english/anima/biosec/biosece.shtml

Enhanced Feed Ban Decision Documents. www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/enhren/decdoce.shtml#waste

Sanitary Precautions and Disinfecting Agents. www.inspection.gc.ca/english/anima/heasan/man/scrtre/scrtre-a2e.shtml

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